

SECTION 307 -- FOUNDATION COURSE

307.01 -- Description

1. The foundation course is a layer of compacted material conforming to the lines, grades, and dimensions shown in the plans. The foundation course is built on an approved subgrade. This work includes:

- a. Placement and maintenance of the control lines.
 - b. Placement of the foundation course.
 - c. Compaction of the foundation course.
 - d. Profiling the foundation course.
 - e. Disposal of excess material after profiling is completed.
2. There are three types of foundation course:
- a. Aggregate
 - b. Bituminous
 - c. Crushed concrete

307.02 -- Material Requirements

1. Aggregate Foundation Course:
- a. Aggregate foundation course shall consist of siliceous gravel and sand aggregate, soil binder, and water.
 - b. Aggregate shall conform to the quality requirements of Subsection 1033.02, Paragraphs 1., 2., and 9., and the gradation requirements of Table 1033.10.
 - c. (1) Soil binder material shall conform to Section 1034 except that:
 - (i) The gradation requirement does not apply.
 - (ii) The plasticity index limits shall be 5 to 25.
 - (2) Soil binder material shall be obtained according to borrow requirements of Sections 205 and 209.
 - d. At least 14 days before beginning foundation course production, the Contractor shall submit a proposed mix design along with a 80 pound aggregate sample and a 20 pound binder sample to the NDR Materials and Tests Engineer for approval. The proposed mix design will:
 - (1) Result in an aggregate and soil binder mix that complies with the requirements of Table 1033.10.
 - (2) Propose single defined values for the percentage passing each sieve on the gradation shown in Table 1033.10.
 - (3) Include the average soil binder and aggregate gradations used to calculate the mix design.

e. The NDR Materials and Tests Engineer will evaluate the soil sample characteristics and determine the specific moisture-density values for the proposed foundation course design.

2. Bituminous Foundation Course:

a. Material used in constructing bituminous foundation course shall consist of salvaged bituminous material. The source of the salvaged bituminous material shall be described in the special provisions or the plans.

b. All salvaged bituminous material must pass a 2 inch sieve just prior to its use.

3. Crushed Concrete Foundation Course:

a. Material used in constructing crushed concrete foundation course shall consist of processed and stockpiled concrete pavement. The source of the crushed concrete shall be described in the special provisions or the plans.

b. The Contractor shall submit for approval a 75 pound sample of crushed concrete which the contractor proposes to use in the work. This sample shall be delivered to the Project Manager or to the Materials and Tests Division, Central Laboratory at least 14 days prior to placement of the foundation course.

c. The required density of the crushed concrete foundation course shall be shown in the plans.

d. The crushed concrete gradation shall be determined as prescribed in NDR T 27 (washed test). The gradation requirement for the crushed concrete foundation course is shown in Table 1033.11

e. Moisture content shall be no higher than necessary to facilitate compaction to required density.

307.03 -- Construction Methods

1. Aggregate Foundation Course.

a. (1) The Contractor shall place and profile the foundation course as shown in the plans.

(2) (i) The foundation course material shall be mixed and moistened in a twin pugmill mixer.

(ii) The foundation course material shall be mixed at a moisture content between optimum and 3 percentage points below optimum.

(3) Before foundation course placement, the subgrade shall be sprinkled lightly with water.

(4) (i) The foundation course material shall be hauled to the road, spread in a uniform layer, and compacted to at least 100 percent of the maximum density as determined by NDR T 99.

(ii) Material placement shall be in sufficient quantity to allow compaction and profiling of the entire surface of a section.

(iii) Uncontaminated material recovered in profiling one section may be uniformly spread on an adjacent unprofiled section.

b. Control of Foundation Course Mixtures:

(1) The gradation of the siliceous gravel and sand aggregate shall be such that, in combination with soil binder, a resultant mixture complying with the requirements shown in Section 1033, Table 1033.10 will be produced.

(2) The foundation course shall have a resistance to displacement that is satisfactory to the Engineer.

c. Obtaining Material for Foundation Course:

This work shall be performed in accordance with the borrow requirements in Sections 205 and 208.

d. Profiling:

(1) The profiling shall be done with the same type of equipment used for the profiling of the subgrade (see Subsection 302.03). The uncontaminated material recovered in profiling to grade shall be spread uniformly on the surface of the subgrade in the subsequent section.

(2) After compaction, the foundation course shall be trimmed such that the thickness of the crushed concrete foundation course will not vary from the plan thickness by more than 1/2 inch.

(3) Sections of foundation course deficient in thickness by more than 1/2 inch shall be corrected at no additional cost to the Department. The Engineer will determine the boundaries of the area to be corrected.

2. Bituminous Foundation Course:

a. The Contractor shall load, haul, distribute, spread, and compact the salvaged bituminous material to form a firm and stable foundation for the construction of the surface. The quantity of bituminous material placed shall be adequate to provide for consolidation and trimming of the entire surface after compaction.

b. (1) The Contractor shall roll the bituminous foundation course until no further compaction can be obtained and all roller marks are eliminated.

(2) The Department will establish a rolling pattern for the project and set a density range.

(3) The Contractor shall monitor the rolling pattern with a nuclear density gauge, testing and recording the density every 1/2 mile.

(4) The Contractor shall take immediate action to correct the foundation course density if any density measurements are outside of the specified range.

(5) The Contractor shall supply the Engineer with a copy of the results of the nuclear density tests at the end of each day.

c. (1) After the foundation course has been compacted and before the surface is trimmed, the thickness shall be measured.

(2) If the thickness of the compacted material is insufficient to permit trimming, the deficiency may be corrected by the placement and compaction of additional material, provided an adequate bond can be established between the compacted surface and the new material. **A tack coat shall be required if there is a material deficiency and additional material is added.**

(3) A tack coat shall be required to bond the new material to the compacted surface.

(4) The trimming operation may be accomplished by milling, if necessary.

(5) During the trimming operation, the control of grade and cross slope shall be through sensors actuated by a taut reference line, erected and maintained by the Contractor, true to line and grade, in order to assure vertical control during the trimming operation.

(6) The accuracy of the preparation of the subgrade and the trimming of the bituminous foundation course will be such that the thickness will not vary from the plan thickness by more than 1/2 inch.

(7) The grade stakes, placed for the purpose of controlling the trimming operation, shall be protected for use in erecting the taut reference line for controlling the elevation of the pavement.

(8) At the Contractor's option, a **fog seal** may be applied in accordance with the requirements of Section 513.

(9) The Contractor will not be allowed to operate construction equipment on the bituminous foundation course if the placement of portland cement concrete on bituminous foundation course is to be performed with equipment which is designed to deliver the material from a position which is outside of the limits of the prepared surface, unless otherwise approved by the Engineer.

(10) The Contractor will minimize the operation of construction equipment on the bituminous foundation course if the placement of asphaltic concrete is required, unless otherwise approved by the Engineer.

3. Crushed Concrete Foundation Course:

a. The Contractor shall load the crushed concrete at the locations shown in the plans or listed in special provisions, haul it to the project site, and distribute, place, and compact the crushed concrete to form a foundation course as shown in the plans.

b. After compaction, the foundation course shall be trimmed so the thickness of the crushed concrete foundation course will not vary from the plan thickness by more than 1/2 inch.

c. The grade stakes, placed for the purpose of controlling the trimming operation, shall be protected for use in erecting the taut reference line for controlling the elevation of the concrete pavement.

4. Foundation course density and thickness testing is the Department's responsibility.

307.04 -- Method of Measurement

1. The foundation course will be measured for payment either by weight (tons) or by the square yard.

2. a. The foundation course weight that is paid for by the ton of accepted material shall be measured on the Contractor's approved scales under the supervision of the Engineer.

b. At the time of weighing, the moisture content of the combined material for the foundation course shall be between optimum and 3 percentage points below optimum moisture content for the mixture as determined by NDR T 99.

c. Weight tickets shall be prepared in duplicate.

d. A copy of the ticket shall accompany the load to the placement site and shall be furnished to the Engineer. Acceptance of the foundation mixture at the placement site will be based upon verification that the material, when compacted, becomes an adequate pavement foundation.

e. Loads which are not accompanied by weight tickets and/or do not arrive in satisfactory condition shall be rejected.

3. Foundation course paid for by the square yard is not measured directly. The overlying pavement is measured, and the pavement quantity is used as the foundation course quantity.

307.05 -- Basis of Payment

1. Pay Item	Pay Unit
Aggregate Foundation Course _____	Ton (Tn)
Aggregate Foundation Course _____	Square Yard (SY)
Bituminous Foundation Course _____	Square Yard (SY)
Crushed Concrete Foundation Course _____	Square Yard (SY)

2. a. If a foundation course is 0.05 to 0.10 foot less than the specified thickness, it shall be removed and replaced; or, at the Contractor's option, the material may be left in place and paid for at 40 percent of the bid price for the deficient areas. The area of the deficient section shall be determined by the Engineer.

b. Foundation course more than 0.10 foot less than the specified thickness shall be removed and replaced at no additional cost to the Department. The extent of the area to be corrected will be determined by the Engineer.

3. Application of a tack coat shall be subsidiary to the item "Bituminous Foundation Course _____".

4. If the Contractor elects to apply a prime coat, it shall be at no cost to the Department.

5. All water applied to foundation course will not be measured for payment but shall be considered subsidiary to the relevant foundation course bid item.

6. Payment is full compensation for all work prescribed in this Section.